

CHAPTER 5 - SKY CONDITION

ADDITIONAL MATERIAL TO STUDY: Chapter 9, paragraphs 9.2.1g & h, ceiling and sky condition criteria for SPECI.

5.1 Introduction

This chapter provides information on sky condition which is a description of the appearance of the sky. It also prescribes the standards and procedures for observing and reporting sky condition in METAR/SPECI reports.

5.2 Observing Standards

Sky condition is evaluated at all stations. Observations of layers, amount, direction of movement, height of bases, and the effect of obscurations on vertical visibility will be taken from as many locations as necessary and practical to view the entire sky.

5.2.1 Sky Condition

Sky condition is a description of the appearance of the sky (celestial dome) as seen from the weather station. The celestial dome is that part of the sky that would be visible above all natural obstructions (hills and trees) if man-made obstructions (buildings) were not present. This means that if your view of the sky is partly obstructed by a nearby building, you are expected to make a reasonable effort to see or estimate what is on the other side. Note that, in Figure 5-1, the celestial dome is bounded by the hills on the left and the trees on the right but not by the building.

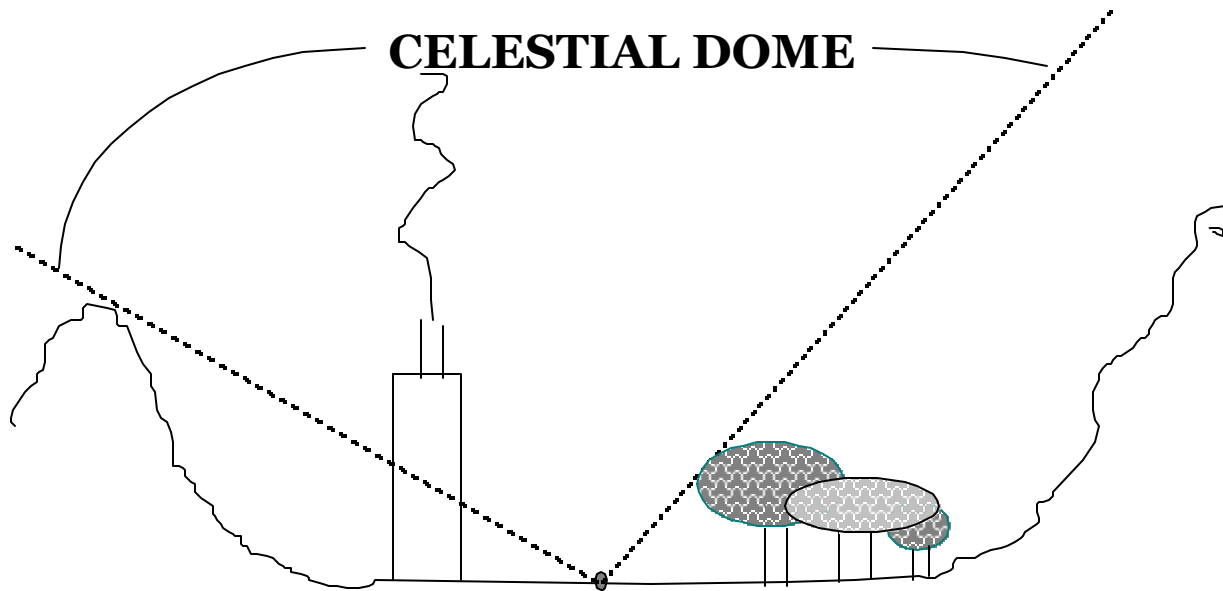


Figure 5-1. Weather Observer's View of Celestial Dome.

5.2.2 Sky Cover

A term used to denote the amount (to the nearest eighth) of the sky (celestial dome) that is hidden by clouds and/or obscurations. Sky cover includes any clouds or obscurations (partial and indefinite ceilings) detected from the observing location. It is evaluated with reference to the surface.

5.2.3 Layer Amounts

The amount in eighths of clouds or obscurations (i.e., smoke, haze, fog, etc.) not necessarily all of the same type, whose bases are at approximately the same level. It may be either continuous or composed of detached elements.

If the layer is on the ground, the sky cover is the eighths of the sky hidden by the phenomenon. That portion of the surfaced-based layer through which the sky can be seen is not considered sky cover. An obscuration that hides part of the sky is reported in both the sky condition and remarks.

Up to six layers may be reported for sky condition; reportable contractions are as follows:

Reportable Contractions	Meaning	Summation Amount of Sky Cover
VV	Vertical Visibility	8/8
SKC	SKy Clear	0
FEW	FEW	less than 1/8 to 2/8
SCT	SCaTtered	3/8 to 4/8
BKN	BroKeN	5/8 to less than 8/8
OVC	OVerCast	8/8

Table 5-1. Reportable Contractions for Sky Cover

5.2.4 Stratification of Sky Cover

Sky cover will be separated into layers with each layer containing clouds and/or obscurations (i.e., smoke, haze, fog, etc.), with bases at about the same height.

5.2.5 Evaluation of Multiple Layers

Frequent observations are necessary to evaluate layers. A series of observations will often show the existence of upper layers above a lower layer. Through thin lower layers, it may be possible to observe higher layers. Differences in the directions of cloud movements are often a valuable aid in observing and differentiating between cloud layers, particularly when the presence of haze, smoke, etc., increases the difficulty of evaluation. Ceiling light indications may be used as a guide in determining the presence of multiple layers at night.

5.2.6 Evaluation of Interconnected Layers

Clouds formed by the horizontal extension of swelling cumulus or cumulonimbus, which are attached to a parent cloud, will be regarded as a separate layer only if their bases appear horizontal and at a different level from the parent cloud. Otherwise, the entire cloud system will be regarded as a single layer at a height corresponding to the base of the parent cloud.

5.2.7 Advancing or Receding Layer

To estimate the amount of an advancing (or receding) layer, determine angular elevation above the horizon of the forward or rear edge of the layer as seen against the sky. Use a clinometer until experience is gained in estimating vertical angles. Convert the angle to eighths of sky cover using Table 5-2. When the layer does not extend to the horizon, determine the angular elevation of the forward and rear edges and the eighths of the sky cover corresponding to each elevation. The difference will equal the sky cover. For example: Forward edge 78 degrees = 3/8 sky cover; rear edge 53 degrees = 2/8 sky cover. Total sky cover is the difference between the two, or 1/8 sky cover.

Angle of Advancing or Receding Layer Edge	Eighths of Sky Cover	Angular Elevation of Layer Surrounding Station
>0 to 50 degrees	1	>0 to 10 degrees
51 to 68 degrees	2	11 to 17 degrees
69 to 82 degrees	3	18 to 24 degrees
83 to 98 degrees	4	25 to 32 degrees
99 to 112 degrees	5	33 to 41 degrees
113 to 129 degrees	6	42 to 53 degrees
130 to <180 degrees	7	54 to 89 degrees
180 degrees	8	90 degrees

Table 5-2. Sky Cover Evaluation

5.2.8 Summation Layer Amount

A categorization of the amount of sky cover at and below each reported layer of clouds and/or obscurations. The summation amount for any given layer is equal to the sum of the sky cover for the layer being evaluated plus the sky cover of all lower layers including partial obscurations. Portions of layers aloft detected through lower layers aloft will not increase the summation amount of the higher layer. A summation amount for a layer cannot exceed 8/8ths.

When multiple layers are visible, the Sky Cover for any given layer is the total of the sky hidden by any surface-based layer plus the amount of sky covered by all layers aloft that are below the layer being evaluated plus the layer being evaluated.

Once you have broken the sky into separate layers, you are expected to determine the sky cover, in eighths, for each of the layers and select a sky cover contraction to represent each layer in the report.

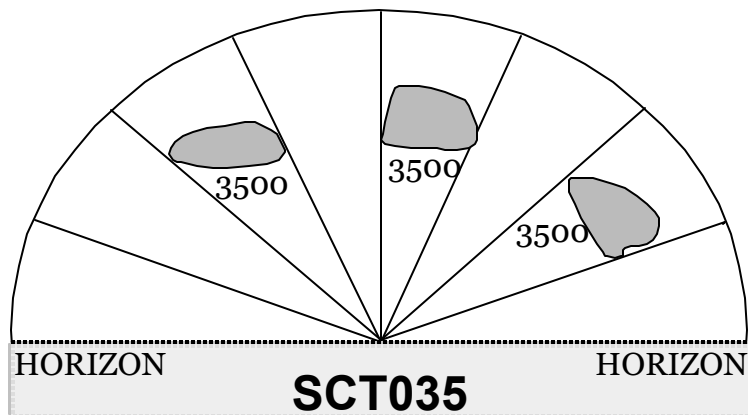
Always start evaluating sky cover at the lowest layer. As you evaluate the sky cover of each layer above, the amount determined must be either equal to or more than the previously evaluated lower layer. For example, if the sky was completely covered by clouds in four different layers and each layer by itself covered 2/8 of the sky, the sky cover determined for each of the layers would be:

First layer (lowest) (200 feet)	(2/8)=	2/8 sky cover (FEW)
Second layer (5,000 feet)	(2/8 + 2/8)=	4/8 sky cover (SCT)
Third layer (10,000 feet)	(2/8 + 4/8)=	6/8 sky cover (BKN)
Fourth layer (highest) (25,000 feet)	(2/8 + 6/8)=	8/8 sky cover (OVC)

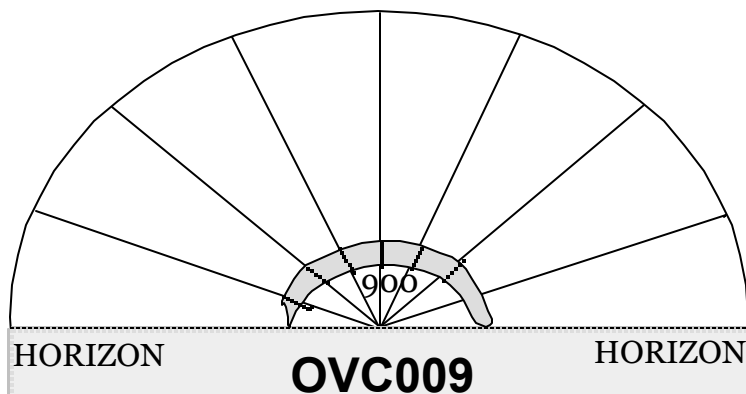
Notice that the sky cover of the highest layer is considered to be 8/8, even though (by itself) it is only covering 2/8 of the sky. The reason for this is that sky cover is always determined with respect to an observer on the ground. The following example would be coded in Sky Condition as:

FEW002 SCT050 BKN100 OVC250

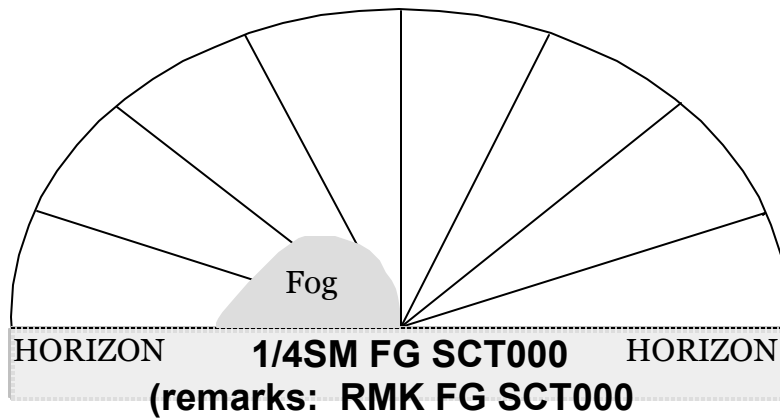
When only one layer is present, determine the amount of sky cover, in eighths, and select a Sky Condition contraction to represent the amount of sky covered, not necessarily hidden by that layer. The layer height is reported using three digits.



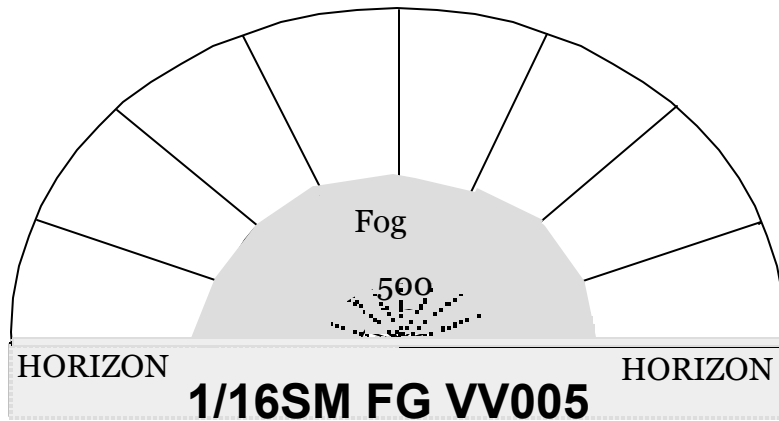
Example 5-2. One Layer with Multiple Cloud Bases



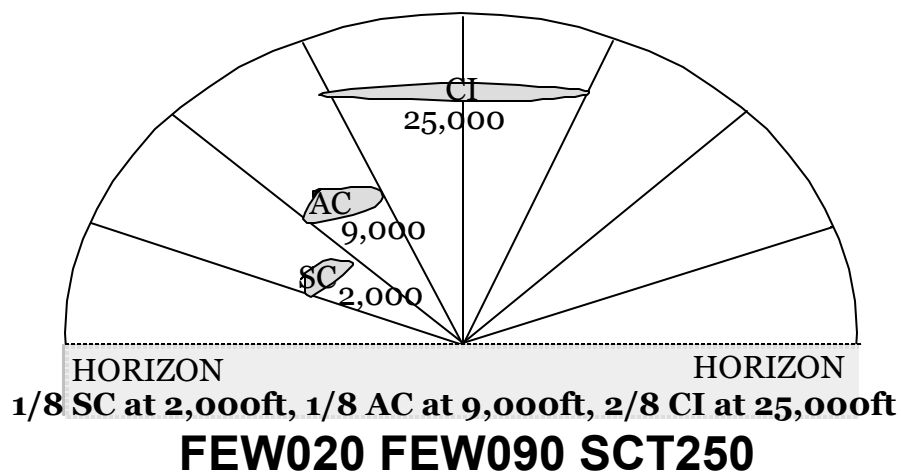
Example 5-3. One Layer with Single Cloud Base.



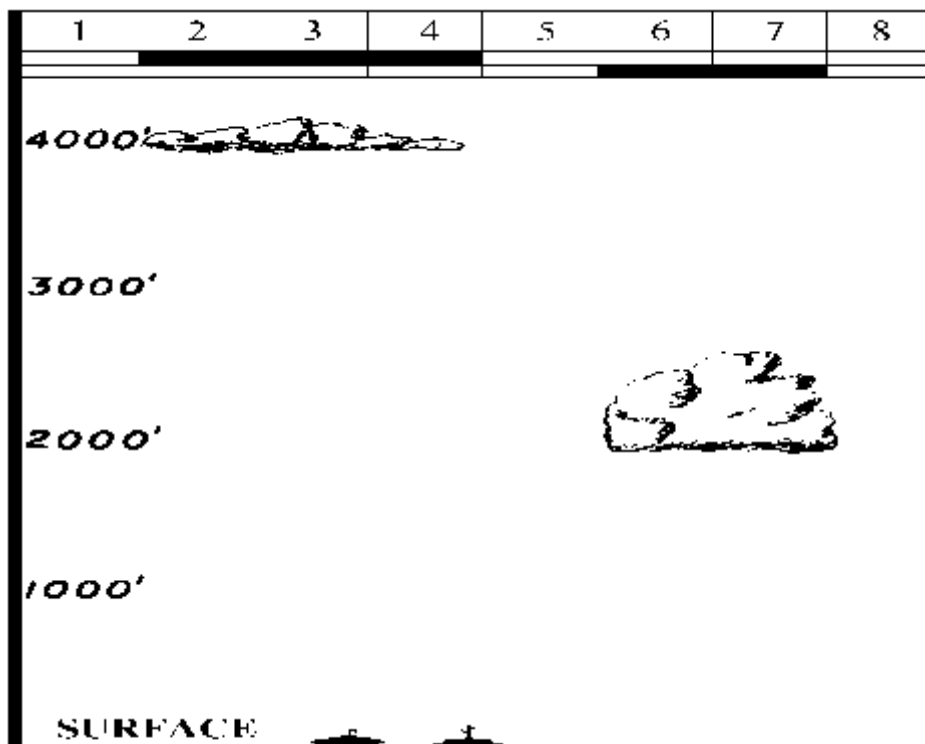
Example 5-4. Surface-based Obscuration.



Example 5-5. Sky Completely Hidden by Surface-based Phenomena

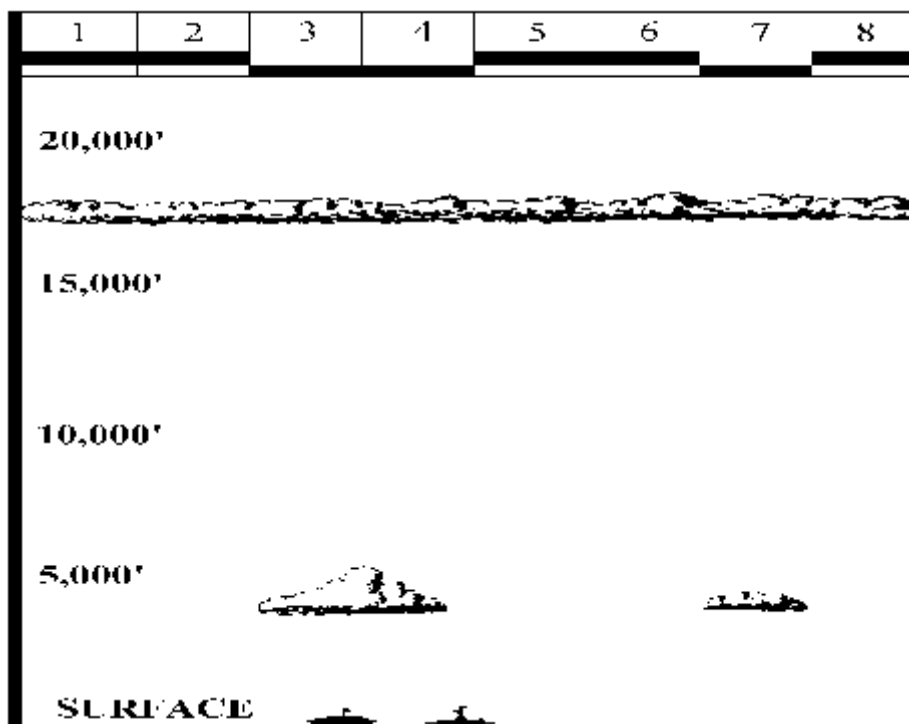


Example 5-6. Three Multiple Layers



LOWER CLOUDS: 2/8 +
HIGHER CLOUDS: 3/8 = 5/8
FEW020 BKN040

Example 5-9. Two Layers



LOWER CLOUDS: 2/8 + 1/8 = 3/8
HIGHER CLOUDS: 5/8
3/8 + 5/8 = 8/8
SCT045 OVC170

Example 5-10. Two Layers.

5.2.9 Layer Height

Is the height of the bases of each reported layer of clouds and/or obscurations in feet above the surface or field elevation. It can also be the vertical visibility into an indefinite ceiling.

Surface-based obscurations are reported in the sky condition with a height of “000.” A layer height of “000” could also mean the layer reported is ≤ 50 feet. To distinguish between a layer aloft and an obscuration, use a remark to describe if the layer reported is really an obscuration.

5.2.10 Layer Opacity

All cloud layers and obscurations aloft are considered opaque.

5.2.11 Ceiling

The height above the earth's surface (field or ground elevation) of the lowest layer **aloft** that is reported as broken or overcast. If the sky is totally obscured (hidden), the height of the vertical visibility will be the ceiling. If the sky is only partially obscured (less than 8/8 of the sky hidden) it is never considered a ceiling.

5.2.12 Indefinite Ceiling

The ceiling classification applied when the reported ceiling value represents the visibility upward (**Vertical Visibility**) into surface-based obscuration that totally hides the sky.

5.2.13 Variable Ceiling

A term that describes a condition in which a ceiling rapidly increases and decreases by one or more reportable values while the ceiling height is being determined.

5.2.14 Surface

The surface shall be the assigned field elevation of the station. Where the field elevation has not been established, the surface will be the ground elevation at the observation site.

5.2.15 Clear Skies

Skies are clear when no clouds or obscurations are observed or detected from the point of observation.

5.2.16 Obscuration

The portion of sky (including higher clouds, the moon, or stars) hidden by weather phenomena either surface-based or aloft. An obscuration is reported in both the sky condition and remarks.

5.2.17 Variable Amounts of Sky Cover

The sky cover is considered variable if it varies by one or more reportable values (FEW, SCT, BKN, or OVC) during the period of evaluation.

5.2.18 Vertical Visibility

Vertical visibility shall be one of the following:

- a. The distance an observer can see upward (vertically) into an indefinite ceiling.
- b. The height corresponding to the top of a ceiling light projector beam.
- c. The height at which a ceiling balloon disappears during the presence of an indefinite ceiling.

5.2.19 Significant Clouds and Cloud Types

Significant clouds include cumulonimbus, cumulonimbus mammatus, towering cumulus, altocumulus castellanus, standing lenticular, or rotor clouds. Cloud types will be identified in accordance with WMO International Cloud Atlas - Volumes I and II, the WMO *Abridged International Cloud Atlas*, or NWS aids for cloud identification.

5.2.20 Height of Sky Cover

A ceilometer, ceiling light, or known heights of unobscured portions of abrupt, isolated objects within 1-1/2 statute miles of a runway shall be used to measure the height of layers aloft. Alternative methods for estimating ceiling height such as ceiling balloon, pilot report or other agency guidelines, or observer experience may be used. Heights of layers observed at the station will be reported in hundreds of feet above the surface (not above MSL) rounded to reportable values specified in Table 5-5.

- a. Indefinite Ceiling Height (Vertical Visibility). The height into an indefinite ceiling will be the Vertical Visibility. It is measured in hundreds of feet.
- b. Height of Layers. The height of a layer is the average height of the cloud bases or obscurations for the evaluated layer. Layers of clouds 50 feet or less will be regarded as layers aloft and have a height of 000. During the period of evaluation, when the ceiling layer's height changes rapidly by amounts given in Table 5-6, it shall be considered variable and the ascribed height will be an average of all the varying values.
- c. Use of alternative methods to estimate ceiling height. When using an alternative method to estimate ceiling height, the following procedures will be used:
 - (1) Use of height reported by a pilot, however, it must be converted from height above mean sea level to height above surface.
 - (2) Choose and inflate the appropriate colored balloon; red balloons are usually preferred with thin clouds and blue or black balloons under other conditions.
 - (a) Release and watch the balloon continuously to determine, with a watch, the length of time that elapses between release of the balloon and its entry into the base of the layer. The point of entry,

for layers aloft, will be considered as midway between the time the balloon begins to fade until the time the balloon completely disappears.

- (b) Determine the height above the surface corresponding to the elapsed ascent time, using Table 5-3 or Table 5-4. The accuracy of the height obtained by the balloon will be decreased when the balloon:
- does not enter a representative portion of the cloud base, or
 - is used at night with a light attached, or
 - is used during the occurrence of hail, ice pellets, any intensity of freezing rain, or moderate to heavy rain or snow.

30-Gram Balloon Ascension Rates* Nozzle Lift 139-Grams Helium				
Time Minutes and Seconds			Reportable Height	
0:00	-	0:04	0	
0:05	-	0:12	100	
0:13	-	0:20	200	
0:21	-	0:30	300	
0:31	-	0:38	400	
0:39	-	0:46	500	
0:47	-	0:55	600	
0:56	-	1:03	700	
1:04	-	1:12	800	
1:13	-	1:22	900	
1:23	-	1:31	1000	
1:32	-	1:40	1100	
1:41	-	1:50	1200	
1:51	-	1:59	1300	
2:00	-	2:08	1400	
2:09	-	2:17	1500	
2:18	-	2:27	1600	
2:28	-	2:36	1700	
2:37	-	2:45	1800	
2:46	-	2:54	1900	
2:55	-	3:03	2000	
3:04	-	3:13	2100	
3:14	-	3:23	2200	
3:24	-	3:32	2300	
3:33	-	3:42	2400	
3:43	-	3:52	2500	
3:53	-	4:01	2600	
4:02	-	4:11	2700	
4:12	-	4:21	2800	
4:22	-	4:31	2900	
4:32	-	4:40	3000	
4:41	-	4:50	3100	
4:51	-	5:00	3200	
5:01	-	5:10	3300	
5:11	-	5:20	3400	
5:21	-	5:31	3500	
5:32	-	5:41	3600	
5:42	-	5:51	3700	
5:52	-	6:01	3800	
6:02	-	6:11	3900	
6:12	-	6:21	4000	
6:22	-	6:32	4100	
6:33	-	6:42	4200	
6:43	-	6:52	4300	
6:53	-	7:02	4400	
7:03	-	7:12	4500	
7:13	-	7:22	4600	
7:23	-	7:33	4700	
7:34	-	7:43	4800	
7:44	-	7:53	4900	
7:54	-	8:24	5000	
8:25	-	8:25+51sec	** 5500	
9:17	-	9:17+51sec	** 6000	
etc.				
* Daytime Use Only				
** Ascension rate above 5,000 feet is 500 feet per 51 seconds				

Table 5-4. 30-Gram Balloon Ascension Rate

- (3) Use of Convective Cloud-Base Height Diagram (WS TA B-0-8). Use this diagram only to estimate the height of cumulus clouds formed in the vicinity of your station. It cannot be used at stations in mountainous or hilly terrain, or to determine the height of other than cumulus clouds. This diagram is most accurate when used to determine the height of cloud bases below 5,000 feet. Use the dry-bulb temperature and dew point to obtain the height of cloud bases above the point of observation.

5.3 Reporting Standards

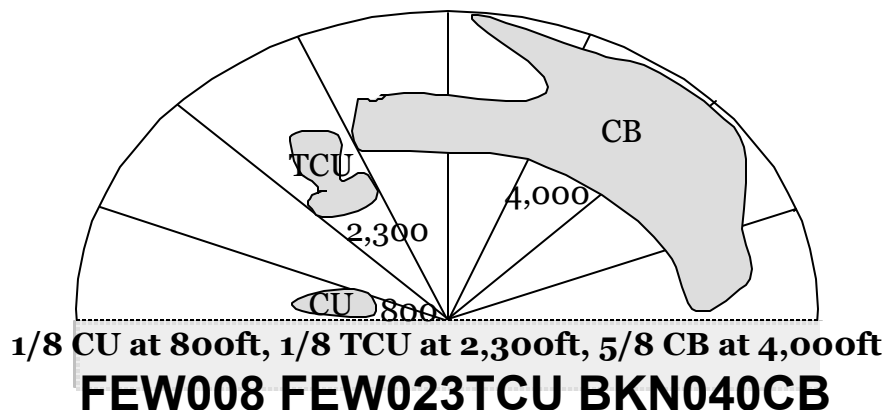
Sky cover will be included in all METAR and SPECI reports.

5.3.1 Layer Amount

The amount of sky cover reported for each layer will be based on the summation layer amount for that layer. Table 5-1, provides the reportable contractions to be used in a report.

Layers composed of cumulonimbus or towering cumulus will be identified by appending the contraction CB or TCU, respectively. If a layer consists of both TCU and CB, report CB. No more than 6 layers will be reported.

Sky condition is reported in ascending order to the first overcast layer. At mountain stations, if the cloud layer is below station level, the height of the layer will be reported as ///.



Example 5-11. Multiple Layers Composed of CB and TCU.

5.3.2 Units of Measure for Heights

Sky cover heights are reported in hundreds of feet above the surface. See Table 5-5, below, for value increments.

Range of Height Values (feet)	Reportable Increment (feet)
$\leq 5,000$	To nearest 100
$> 5,000$ but $\leq 10,000$	To nearest 500
$> 10,000$	To nearest 1,000

Table 5-5. Increments of Reportable Values of Sky Cover Height

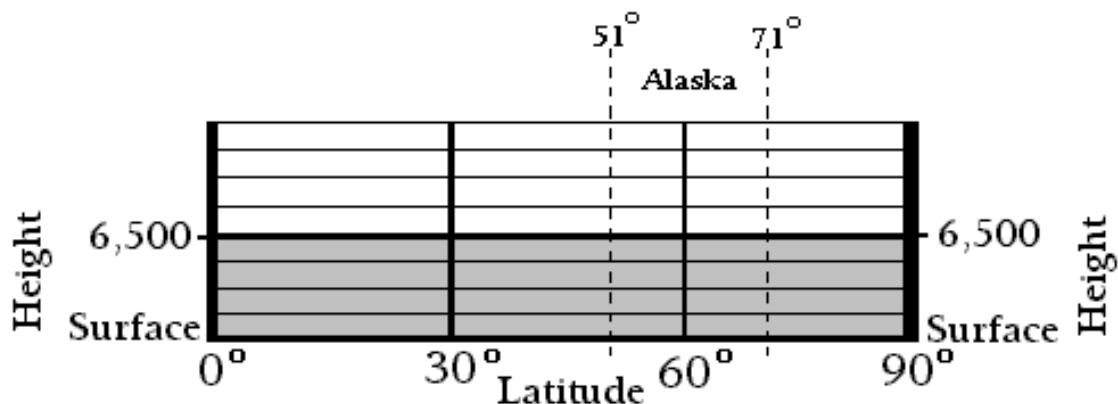
5.3.3 Layer Heights

Heights of layers will be reported in hundreds of feet and rounded to the nearest reportable increment. When a value falls halfway between two reportable increments, the lower value shall be reported. When a layer is 50 feet or less above the surface, the height reported is 000.

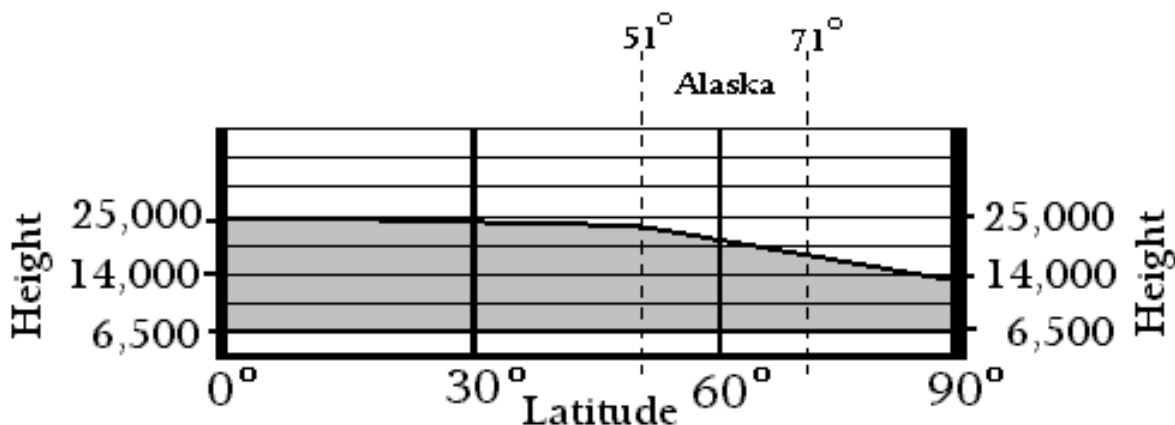
When it is possible to measure the height of clouds, determining the height is not much of a problem. However, you will have to estimate cloud heights quite often when the clouds are beyond the limits of the system available for measuring them, when instruments are inoperative, when clouds are scattered, etc. This estimation is especially difficult for the new observer.

Clouds are grouped into three families according to the height of their bases above the ground. These families are:

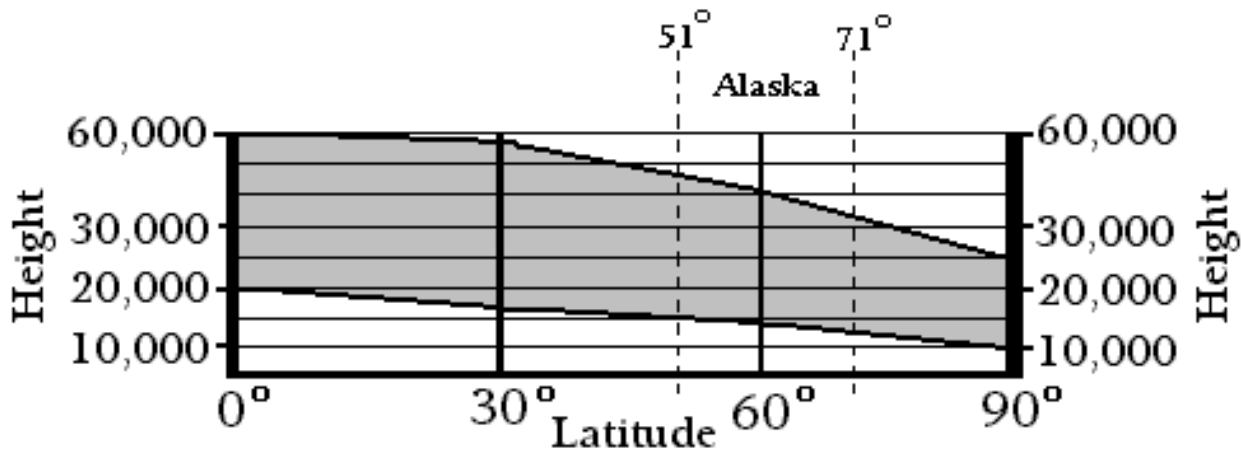
- a. Low level clouds: Stratocumulus, Stratus, Cumulus, Cumulonimbus - (to 6,500 feet)¹



- b. Middle level clouds: Altocumulus, Altostratus, Nimbostratus - (6,500 feet to 25,000 feet)¹



- c. High level clouds: Cirrus, Cirrocumulus and Cirrostratus - (10,000 feet to 60,000 feet)¹



¹ Height range depends on Latitude location.

Record the height above the surface of the base of each layer aloft just after (no space) the sky cover contraction representing the layer. Record the heights of layers in hundreds of feet and rounded to the nearest reportable increment. When a value falls halfway between two reportable increments, the lower of the two shall be reported. When a layer is 50 feet or less above the surface, the height is reported as 000. The height of each layer is reported using three digits. For example, a broken layer at 23,451 feet would be recorded as BKN230. The recorded height was determined by rounding 23,451 feet to 23,000 feet and dropping the last two zeros. If the height had been 800 feet, this would be recorded as BKN008. Remember the heights of layers are in hundreds of feet and recorded using three digits, so leading zeros would be used.

Heights are not assigned to the sky cover contraction SKC, since this means zero clouds are present.

If the sky is completely hidden by surface-based phenomena such as fog or precipitation, the height ascribed to the surface-based layer is the **Vertical Visibility** into the layer. For example, if fog hides 8/8 of the sky and the observer can only see 500 feet vertically into the fog, the observer would report the sky condition (column 10) as VV005. A remark would not be needed for this sky condition. Vertical Visibility can be determined by the distance a ceiling light beam penetrates into the obscuring phenomena, the height at which a ceiling balloon completely fades from sight, the known heights of unobscured buildings, control towers, etc., that are within 1 1/2 miles from any runway, or the distance an observer on the ground can see upward into an obscuring phenomenon.

Once you have determined the amount and height of each layer present at the station, you will know what layer the ceiling will be. If you have learned to evaluate the sky cover and record it correctly, then determining the ceiling is relatively easy. The ceiling is the lowest layer **aloft** reported as broken or overcast, or if the sky is totally obscured, the height of the vertical visibility will be the ceiling.

When the cloud height is varying rapidly while you are trying to obtain a height, report the average of all observed values as the height of the layer. *Also see 5.3.5 for reporting a variable ceiling.

5.3.4 Obscuration

A surface-based obscuration is reported using the sky cover amount of the obscuration (FEW, SCT, BKN) and the height of “000” in the body of the report. It will also be reported in remarks. The remark will consist of the phenomenon causing the obscuration (i.e., fog, smoke, haze, etc.), a space, then the layer amount and height (e.g., FG FEW000, FU SCT000, HZ BKN000).

An obscuration aloft is reported when the obscuration is above the surface of the ground using the sky cover amount of the obscuration (FEW, SCT, BKN, OVC) and the height of the obscuration. It will also be reported in remarks. The remark will consist of the phenomenon causing the obscuration (i.e., smoke, volcanic ash, etc.), a space, then the layer amount and height (e.g., FU BKN040, VA OVC015).

5.3.5 Variable Ceiling*

If the height of the ceiling layer is less than 3,000 feet and the amount of change is according to the criteria given in Table 5-6, a remark is included in column 14 of MF1M-10 giving the range of variability. For example, “CIG 005V010” would indicate a ceiling that was varying between 500 and 1,000 feet. If the ceiling layer is 3,000 feet or higher a variable ceiling is not reported.

Ceiling (feet)	Variation (feet)
$\leq 1,000$	≥ 200
$> 1,000$ and $\leq 2,000$	≥ 400
$> 2,000$ and $< 3,000$	≥ 500

Table 5-6. Criteria for Variable Ceiling

5.3.6 Variable Sky Condition

This term describes a condition when the reportable amount of a layer varies by one or more reportable values, e.g., SCT to BKN, OVC to BKN, FEW to SCT, etc.

The variable sky condition remark is used to report two operationally significant sky conditions. A “V” is used to separate the variability between the two ranges. For example, a cloud layer varying between broken and overcast would be coded “BKN V OVC.” If there are several layers with the same sky condition amount, the layer height of the variable layer will also be reported. For example, if there were two scattered layers reported, one at 500 feet, the other at 1,400 feet, and the layer at 1,400 feet is varying between scattered and broken the remark would be coded “SCT014 V BKN.”

5.3.7 Significant Cloud Types

Information concerning significant cloud types is be provided in the remarks portion of the report. Significant clouds include cumulonimbus, cumulonimbus mammatus, towering cumulus, altocumulus castellanus, standing lenticular, or rotor clouds.

THIS DIAGRAM CAN ONLY BE USED TO DETERMINE THE HEIGHT OF CUMULUS CLOUDS

Example A:

Dew-point temperature = 34 F°
 Dry-bulb temperature = 65 F°
 Convective cloud height = 7,000 ft.

Example C:

Dew-point temperature = 72 F°
 Dry-bulb temperature = 85 F°
 Convective cloud height = 3,000 ft.

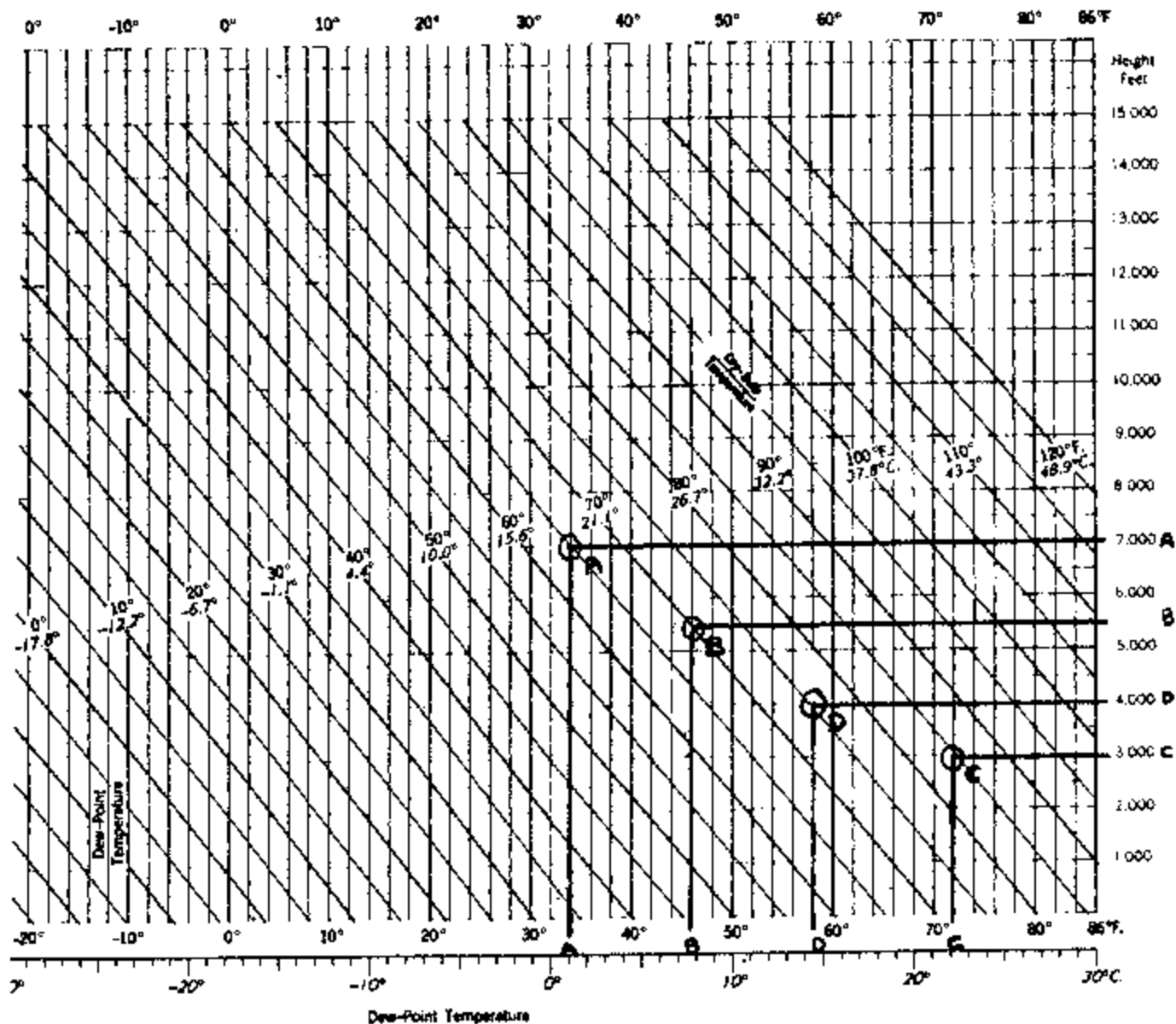
Example B:

Dew-point temperature = 46 F°
 Dry-bulb temperature = 70 F°
 Convective cloud height = 5,500 ft.

Example D:

Dew-point temperature = 58 F°
 Dry-bulb temperature = 75 F°
 Convective cloud height = 4,000 ft.

CONVECTIVE CLOUD-BASE HEIGHT DIAGRAM



Determination of Convective Cloud-Base Heights

SKY COVER CONTRACTIONS		
Summation Amount of Sky Cover in octas [eights]	Contractions	Remarks
8/8 Surface-based obscuring phenomena	VV	This is always followed by a Vertical Visibility value. The value is the height ascribed to the surface-based layer such as fog or precipitation and is the Vertical Visibility <u>into</u> the layer in hundreds of feet. There is no space between the contraction and the height value.
0/8 Sky is clear with zero sky cover	SKC	Never used in combination with other contractions, however, it can be used in conjunction with a layer below the station level, e.g., FEW/// SKC. This would only occur at a mountain station.
Less than 1/8 to 2/8	FEW	Even when sky cover is less than 1/8 it is reported. Height value following this contraction is not considered as ceiling layer. There is no space between the contraction and the height value.
3/8 to 4/8	SCT	Height value following this contraction is not considered as ceiling layer. There is no space between the contraction and the height value.
5/8 to less than 8/8	BKN	Height value following this contraction is considered as ceiling layer provided a lower ceiling layer is not present. There is no space between the contraction and the height value.
8/8 Sky is completely covered	OVC	Height value following this contraction is considered as ceiling layer provided a lower broken layer is not present. There is no space between the contraction and the height value.
Layers composed of cumulonimbus or towering cumulus are identified by appending the contraction CB or TCU, respectively following the height value. If a CB and a TCU are present at the same level, only the CB is reported in the Sky Condition. However, a remark would still be make to show the TCU's location.		
<p>If the layer is on the ground, the sky cover is the eights of the sky hidden by the phenomenon. That portion of the surfaced-based layer through which the sky can be seen is not considered sky cover. A layer on the ground that hides part of the sky is reported in both the sky condition and remarks.</p> <p>Surface-based obscurations are reported in the sky condition with a height of "000". A layer height of "000" could also mean the layer reported is ≤ 50 feet. To distinguish between a layer aloft and an obscuration a remark is made in column 14. This remark repeats the layer amount and height and prefixes the phenomenon causing the obscuration. For example, a remark of "FG SCT000" indicates the layer reported in the sky condition (SCT000) is an obscuration, i.e., 3/8 to 4/8 of the sky is hidden by fog (FG). Only FEW000, SCT000, and BKN000 are used for a surface-based obscuration.</p> <p>When an obscuration is aloft, that is above the surface of the ground, it is reported in the sky condition using the sky cover amount of the obscuration (FEW, SCT, BKN, OVC) and the height of the obscuration. To distinguish it from a layer of clouds a remarks is made in column 14. This remark repeats the layer amount and height and prefixes the phenomenon causing the obscuration.</p> <p>When the layer is aloft (not on the ground), the sky cover of the layer is the amount of the sky that is covered by the layer. For the purpose of determining sky cover of a layer aloft, it does not matter whether you can see through the layer. For example, if a layer aloft covered 7/8 of the sky, but the sky was visible through all of the layer, the sky cover for that layer would be 7/8.</p>		

Examples of Summation of Sky Condition/Total Sky Cover					
Sky Cover Layers (all layers opaque)	Summation	Appropriate Contraction	Sky Condition/Remarks/Total Sky Cover Entries		
			Column 10	Column 14	Column 17
1. 2/8 sky hidden by fog 3/8 sky cover at 1,000 feet 2/8 sky cover at 5,000 feet	2/8 5/8 7/8	FEW BKN BKN	FEW000 BKN010 BKN050	FG FEW000	7
2. Less than 1/8 (less than 1/16) sky cover at 500 feet Less than 1/8 (1/16) sky covered at 2,000 feet 4/8 sky cover at 3,000 feet [composed of cumulonimbus] Less than 1/8 (less than 1/16) sky cover at 9,000 feet	0/8 1/8 5/8 5/8	FEW FEW BKN BKN	FEW005 FEW020 BKN030CB BKN090	CB N MOV E	5
3. 5/8 sky cover at 1,000 feet 2/8 sky cover at 5,000 feet Less than 1/8 (1/16) sky cover at 30,000 feet	5/8 7/8 7/8	BKN BKN BKN	BKN010 BKN050 BKN300		7
4. 1/8 sky cover at 1,000 feet (smoke aloft) 2/8 sky cover at 5,000 feet [composed of towering cumulus] 1/8 sky cover at 35,000 feet	1/8 3/8 4/8	FEW SCT SCT	FEW010 SCT050TCU SCT350	FU FEW010 TCU DSNT W	4
5. Sky hidden by snow, vertical visibility 1,000 feet	8/8	VV	VV010		8
6. 6/8 sky hidden by fog 2/8 sky cover at 500 feet	6/8 8/8	BKN OVC	BKN000 OVC005	FG BKN000	8
Partly Opaque Sky Cover Layers					
7. 7/8 sky cover at 500 feet (smoke aloft) - [0/8 opaque]	7/8	BKN	BKN005	FU BKN005	7
8. 7/8 sky cover by fog - [0/8 opaque]	0/8	SKC	SKC		0
9. 1/8 sky hidden by surface smoke - [1/8 opaque] 5/8 sky cover at 1,000 feet - [1/8 opaque] 2/8 sky cover at 5,000 feet - [all opaque]	1/8 6/8 8/8	FEW BKN OVC	FEW000 BKN010 OVC050	FU FEW000	8
10. 4/8 sky cover at 1,000 feet - [2/8 opaque] 1/8 sky cover at 2,000 feet - [1/8 opaque] 2/8 sky cover at 5,000 feet - [0/8 opaque] 1/8 sky cover at 9,000 feet - [1/8 opaque]	4/8 5/8 7/8 8/8	SCT BKN BKN OVC	SCT010 BKN020 BKN050 OVC090		8
11. 3/8 cover by fog - [2/8 opaque] 2/8 cover at 500 feet - [2/8 opaque] 3/8 cover at 2,000 feet - [1/8 opaque]	2/8 4/8 7/8	FEW SCT BKN	FEW000 SCT005 BKN020	FG FEW000	7

PRESENT WEATHER	SKY CONDITION	TEMP. (°C)	DEW POINT (°C)	ALTIMETER SETTING (Ins.)	REMARKS AND SUPPLEMENTAL CODED DATA	TOTAL SKY COVER (0-8)
(9)	(10)	(11)	(12)	(13)	(14)	(17)

SKY CONDITION
VISIBLE TO OBSERVER

Entries are made in column 10, and if appropriate, in column 14 for all observations.

REMARKS

TOTAL
SKY
COVER

SKY COVER CONTRACTION

8/8....VV OVC....8/8
0/8....SKC FEW....less than 1/8 to 2/8
3/8 - 4/8....SCT BKN....5/8 to less than 8/8

Enter contraction for each layer up to and including the first OVC layer.

HEIGHTS

Enter height above surface for each VV, FEW, SCT, BKN, and OVC layer. Encode heights in hundreds of feet as follows:

0 - 5,000' to nearest 100'
above 5,000 - 10,000 to nearest 500'
above 10,000 to nearest 1,000'

If layer is composed of cumulonimbus or towering cumulus append to the height the contraction CB or TCU, respectively. If a layer consists of both TCU and CB, report CB. Enter location of TCU and/or CB in column 14. For example, a layer of clouds cover three-eighths of the sky at two thousand five hundred feet with a towering cumulus cloud overhead as part of this layer. A higher layer of clouds that cover five-eighths of the sky at twenty-five thousand feet is also seen; this would be reported column 10 as; SCT025TCU OVC250 with the remark TCU OHD in column 14..

If height of Ceiling layer is variable, and less than 3,000 feet enter remark in column 14

Whenever a layer reported in column 10 is composed of an obscuration enter the type of phenomenon hiding the sky if surface-based or covering the sky if aloft followed by a space then repeat the sky cover contraction and height of the layer containing the obscuration in column 14.

Variable ceiling height below 3,000 feet

CIG (lowest height)V(highest height);
e.g., CIG 003V006

Obscuration (surface-based)
(only FEW, SCT, & BKN used)

(Type) (sky cover contraction & height);
e.g., FG SCT000

Obscuration (aloft)
(FEW, SCT, BKN, & OVC used)

(Type) (sky cover contraction & height);
e.g., FU OVC002

Variable sky condition

(Present condition) V (variation); e.g., SCT V BKN. Use height to distinguish between similar sky condition amounts; e.g., BKN018 V OVC

SIGNIFICANT CLOUD TYPES

Cumulonimbus

CB (location) (movement); e.g., CB OHD MOV E. If a CB was not overhead but was within 10 statute miles west of the station moving toward the east it would be coded CB VC W MOV E. A CB more than 10 statute miles to the west would be coded CB DSNT W

Cumulonimbus mamma

CBMAM (location) (movement); e.g., CBMAM SW MOV NE

Towering cumulus

TCU (location); e.g., TCU SW-N

Alto cumulus castellaneous

ACC (location); e.g., ACC VC N

Lenticular clouds

ACSL (location); e.g., ACSL S-NW

Rotor clouds

ROTOR CLD (location); e.g., ROTOR CLD VC S

For each observation, enter the eighths of the sky hidden by surface-based layers plus the eighths of sky covered by all layers aloft. Numbers used: 0 through 8.

REVIEW QUESTIONS

1. Cloud heights are reported in increments of hundreds of _____.
 - a. feet
 - b. meters
 - c. oktas
 - d. yards
2. Types of reportable layers are _____.
 - a. X, SCT, BKN, OVC
 - b. VV, FEW, SCT, BKN, OVC
 - c. -X, SCT, BKN, OVC
 - d. WW, OHD, FRQ, CON
3. At manual reporting stations, the contraction for clear skies is _____.
 - a. CLR
 - b. No CLDS
 - c. SKC
 - d. VV
4. The contraction used to describe a total ground-based obscuration is _____.
 - a. W
 - b. VV
 - c. X
 - d. SKC
5. All cloud layers and obscurations aloft are considered to be:
 - a. either opaque or transparent
 - b. opaque
 - c. translucent
 - d. measurable
6. The amount of sky cover for each layer shall be observed in:
 - a. sectors
 - b. quadrants
 - c. tenths
 - d. eighths
7. A cloud layer with a base less than 50 feet is reported:
 - a. with a height of 0 feet
 - b. with a height of 50 feet
 - c. with a height of 100 feet
 - d. as an obscuration

REVIEW QUESTIONS

8. If a layer aloft has less than 1/8 of sky cover, the reportable contraction is:
- SKC
 - FEW
 - SCT
 - VV
9. The sky cover summation amount for any given layer is the sum of the sky cover for the layer being evaluated plus the sky cover of:
- all upper layers
 - all lower layers excluding obscurations
 - all lower layers including obscurations
 - no other layers
10. The sky cover shall be considered variable if it:
- varies one or more reportable values
 - varies one reportable value only
 - contains more than one layer
 - is fragmented by strong gusty winds
11. The portion of the sky cover hidden by weather phenomena either surface-based or aloft describes:
- vertical visibility
 - obscuration
 - layer summation
 - ceiling
12. When the height of a layer falls halfway between two reportable values, the _____ value is reported.
- lower
 - upper
 - exact
 - observer's discretion
13. Which of the following is never reported as a ceiling?
- A broken layer of clouds.
 - A layer over a layer of fog that hides more than half the sky.
 - A layer of fog hiding 7/8 of the sky.
 - The vertical visibility into precipitation that hides the entire sky.
14. When the ceiling height is variable, the height in Column 10 (Sky Condition), is the _____ of all observed heights.
- minimum
 - maximum
 - average
 - sum

REVIEW QUESTIONS

15. A layer of smoke is observed at 900 feet obscuring less than 1/8 sky cover. What is reported in Column 9 (Present Weather), Column 10 (Sky Condition), and Column 14 (Remarks)?
- a. Col. 9: FU; Col. 10: FEW000 FEW009; Col. 14: FU FEW000
 - b. Col. 9: nothing; Col. 10: FEW009; Col. 14: FU FEW009
 - c. Col. 9: nothing; Col. 10: FEW000; Col. 14: FU FEW000
 - d. Col. 9: FU; Col. 10: FEW009; Col. 14: nothing
16. The vertical visibility into a snow shower that hides the whole sky is estimated to be 300 feet. What would be the correct entry in Column 10 (Sky Condition)?
- a. OVC003
 - b. VV030
 - c. VV003
 - d. OVC030
17. If an observing station is so located that an unobstructed view of the sky cannot be obtained because of manmade structures, then for purposes of determining layer amount, the whole sky will be considered as:
- a. the whole sky including the obstructed portion.
 - b. the portion of the sky visible to the observer.
 - c. a mean area considered the percentage of sky hidden.
 - d. A mean area considered the percentage of sky visible to the observer.
18. The sky is covered by a combination of 4/8 mist (obscuring), 2/8 clouds at a measured 500 feet, and 2/8 clouds at an estimated 4,000 feet. The correct sky condition entries on MF1M-10C, are:
- a. SCT001 BKN005 OVC040 with the remark, BR SCT001.
 - b. SCT000 BKN005 OVC040 with no remarks.
 - c. SCT000 BKN005 BKN040 with the remark, BR SCT000.
 - d. SCT000 BKN005 OVC040 with the remark, BR SCT000.
19. A ceiling is measured at 4,000 feet overcast, but is variable from 3,500 to 4,500 feet. This is coded as:
- a. OVC040 and in remarks, CIG 035V045
 - b. OVC040
 - c. OVC040 and in remarks, CIG VRB 035V045
 - d. OVC040V
20. The height of an overcast layer of stratus clouds cannot be determined with a:
- a. pilot report.
 - b. convective cloud height diagram.
 - c. ceilometer.
 - d. balloon.

REVIEW QUESTIONS

21. Which of the following is not considered a ceiling?
- a. a broken layer of clouds
 - b. A layer of mist hiding 6/8 of the sky
 - c. the vertical visibility into fog that hides the entire sky
 - d. a layer of clouds above a layer of fog that hides more than half the sky
22. The sky is covered by 5/8 clouds at 5,000 feet, and 3/8 at 18,000 feet. This is reported as
- a. BKN050 BKN180
 - b. SCT050 OVC180
 - c. BKN050 OVC180
 - d. BKN050 SCT180
23. A layer of smoke aloft at an estimated 1,000 feet covers 2/8 the sky. Clouds cover 5/8 of the sky at an estimated 4,000 feet. The correct entries for sky cover, and remarks if required, are
- a. BKN040 and a remark FU010
 - b. SCT010 BKN040 and a remark FU SCT010
 - c. FEW010 BKN040 and a remark FU FEW010
 - d. FEW010 BKN040 and no remarks
24. A layer of TCU and CB at 2,500 feet covers 3/8 of the sky. The correct entries for sky cover are:
- a. SCT025CB/TCU
 - b. SCT025TCU
 - c. SCT025CB
 - d. FEW025CB
25. A layer of clouds covers 0/8 of the sky is at 50 feet another layer covers 2/8 of the sky is at 1,500 feet with an additional layer covering 6/8 of the sky at a measured 6,900 feet will be reported as
- a. SCT015 OVC069
 - b. FEW000 FEW015 OVC070
 - c. FEW015 BKN069
 - d. FEW001 FEW015 OVC070
26. Which of the following shall be used to measure the height of layers aloft?
- a. The known heights of unobscured portions of objects within 1½ statute miles of a runway
 - b. A pilot who landed an hour ago
 - c. The upper limit of a ceiling light during fog
 - d. The time at which a ceiling balloon completely disappears
27. When an overcast layer is varying in height between 900 and 1200 feet, the appropriate entries in columns 10 and 14 are
- a. OVC011 and a remark CIG 009V012
 - b. OVC009V012 and a remark CIG OVC010
 - c. OVC010 and a remark CIG 009V012
 - d. OVC010 and a remark CIG012V009

REVIEW QUESTIONS

28. Vertical visibility is
- the distance an observer can see vertically into an indefinite ceiling.
 - the height at which a ceiling balloon disappears.
 - the midway point between the time a ceiling balloon begins to fade until it disappears.
 - both a. and b.
29. Fog reduces the visibility in all directions to $\frac{1}{4}$ mile and completely hides the sky. The observer can see 100 feet into the obscuration. This sky condition would be reported as
- OVC000
 - OVC001
 - VV000
 - VV001
30. Which change in sky condition does not require a special observation?
- SCT008 to SKC
 - BKN013 to BKN006
 - OVC009 to OVC010
 - SKC to FEW008
31. A smoke layer, based at the surface, completely hides $\frac{7}{8}$ of the sky. The remaining $\frac{1}{8}$ is covered by transparent cirrostratus estimated at 25,000 feet is observed overhead. How would this be reported in the body and remarks section of the METAR observation?
- OVC250 and no remark
 - BKN000 OVC250 with no remark
 - OVC250 with a remark of FU BKN000
 - BKN000 OVC250 with a remark of FU BKN000
32. $\frac{3}{8}$ of the sky is hidden by fog that has reduced the prevailing visibility to $\frac{1}{2}$ statute miles and the current temperature is -15.2°F . The correct entries for column 9 (present weather) and column 14 (remarks) would be:
- FZBR and a remark FZBR SCT000
 - FZFG and a remark FZFG SCT000
 - BR and a remark BR SCT000
 - FG and a remark FG SCT000
33. The sky cover classification "scattered" requires a summation amount of at least?
- $\frac{1}{8}$
 - greater than $\frac{5}{8}$
 - $\frac{5}{8}$
 - $\frac{3}{8}$

REVIEW QUESTIONS

34. Which of the following summation amounts would be classified as “broken”?
- a. $\frac{4}{8}$
 - b. $\frac{8}{8}$
 - c. greater than $\frac{7}{8}$ but less than $\frac{8}{8}$
 - d. $\frac{3}{8}$
35. Which of the following summation amounts would be classified as “few”?
- a. less than $\frac{1}{8}$
 - b. $\frac{3}{8}$
 - c. $\frac{0}{8}$, no clouds
 - d. $\frac{4}{8}$
36. Which of the following summation amounts would be classified as “overcast”?
- a. greater than $\frac{7}{8}$ but less than $\frac{8}{8}$
 - b. $\frac{7}{8}$
 - c. less than $\frac{1}{8}$
 - d. $\frac{8}{8}$
37. The sky is covered by $\frac{1}{8}$ clouds at 46 feet, and $\frac{2}{8}$ clouds at 6,315 feet, also $\frac{2}{8}$ clouds at 11,557 feet. This is reported as:
- a. FEW000 SCT065 BKN120
 - b. FEW005 FEW063 BKN115
 - c. FEW001 FEW060 BKN120
 - d. FEW000 SCT063 BKN110